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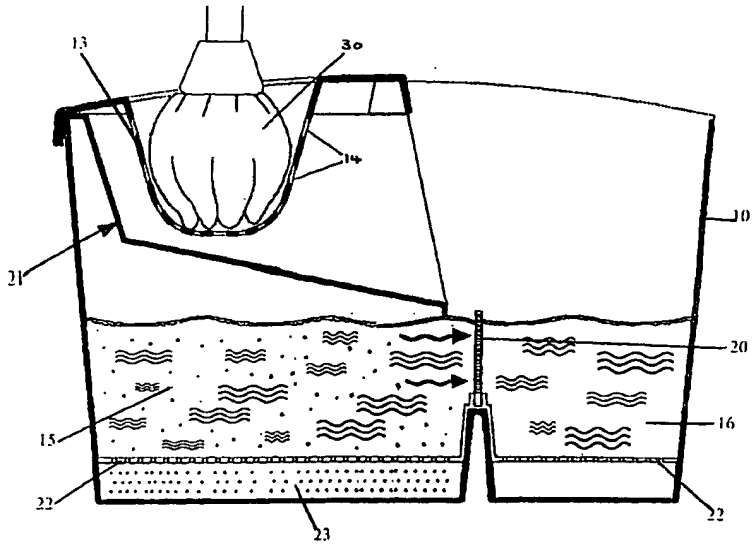
(54) Title: IMPROVEMENTS IN OR RELATING TO CLEANING APPARATUS



(57) Abstract: The present invention relates to improvements in or relating to cleaning apparatus, in particular to buckets (hereinafter referred to as 'mop buckets') (10) for use with mops and similar articles for cleaning floors. We describe a vessel for use with a mop or similar floor-cleaning apparatus. The vessel comprises first and second fluid reservoirs (15, 16) in fluid communication through a filter element (20), the vessel further comprising draining means (12, 31, 32) adapted for use in draining excess fluid from a mop.

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IMPROVEMENTS IN OR RELATING TO CLEANING APPARATUS

The present invention relates to improvements in or relating to cleaning apparatus, in particular to buckets (hereinafter referred to as 'mop buckets') for use with mops and similar articles for cleaning floors.

Conventional mop buckets comprises a reservoir for water and means positioned above the reservoir adapted to allow removal of excess water from a mop head placed therein. Such means are typically referred to as 'wringers.' For example, in a typical mop bucket for household use, the wringer comprises a perforated, generally conically shaped bowl. In use, water is placed into the reservoir, a mop is wetted by being placed in the reservoir and is then placed into the perforated bowl. Excess water is removed by applying downward pressure to the mop via its handle together with twisting of the mop in the perforated bowl. Mop buckets for commercial use commonly include a system of perforated panels between which the wetted mop is placed. Pressure is applied to the mop between the panels, typically by means of a lever, bringing the panels closer together, thereby squeezing water from the mop.

A problem with existing mop bucket arrangements is that once the mop has been used to clean an area of the floor, it is placed into the reservoir of water again to re-wet it prior to cleaning another area of the floor. Very quickly, the water in the reservoir becomes dirty with the result that the water must be changed frequently. In practice, however, the result is that excessively dirty water is used to wash the floor.

The present invention seeks to overcome this problem with the prior art.

In its broadest sense, there is provided a vessel for use with a mop or similar floor-cleaning apparatus, the vessel comprising first and second fluid reservoirs in fluid communication through a filter element, the vessel further comprising draining means adapted for use in draining excess fluid from a mop.

Preferably, the filter element is removable.

Suitably, the filter element comprises a filter element case having an inlet and an outlet defining a fluid flow path and a filter is provided in the fluid flow path. Suitably, the filter comprises an open-cell foamed material. Preferably, the filter has a plurality of regions of different porosity or includes additional components of different porosity from the foamed material.

Preferably, each reservoir includes a sump filter. Suitably each sump filter comprises a perforated sheet.

In one embodiment, the draining means comprises a generally conically shaped bowl having a plurality of perforations therein.

In an alternative embodiment, the draining means comprises two opposed perforated plates or grilles moveable with respect to each other between a first position in which the plates or grilles have a first separation and a second position in which the plates have a second separation, at least a portion of said second separation being greater than said first separation.

Preferably, the draining means includes a deflector element adapted to direct a flow of fluid into said first reservoir.

The above and other aspects of the present invention will now be described in further detail with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a first embodiment of a vessel in accordance with the present invention;

Figure 2 is an elongate cross-section through the vessel of Figure 1 in a first configuration;

Figure 3 is an elongate cross-section through the vessel of Figure 1 in a second configuration;

Figure 4 is a part cut-away perspective view of the embodiment of Figure 1;

Figure 5 is a cross section through a second embodiment of a vessel in accordance with the present invention;

Figure 6 is a perspective view of a first embodiment of a partly assembled filter assembly suitable for use with the embodiment of Figure 1 or Figure 5;

Figure 7 is a cross-section through the filter assembly of Figure 6;

Figure 8 is a partly exploded perspective view of the filter carrier element of Figure 6;

Figure 9 is a first perspective view of a second embodiment of a partly assembled filter assembly suitable for use with the embodiment of Figure 1 or Figure 5;

Figure 10 is a second perspective view of the filter assembly of Figure 9;

Figure 11 is a perspective view of a third embodiment of a filter element suitable for use with the embodiment of Figure 1 or Figure 5; and

Figures 12 to 14 are schematic plan views of alternative reservoir arrangements.

Figures 1 to 4 illustrate a first embodiment of a vessel in accordance with the present invention in the form of a mop bucket 10 of generally rectangular plan form with a carrying handle 11 and a wringer 12. Wringer 12 is of the type described above comprising a generally conically shaped bowl 13 having a plurality of perforations 14 and rests upon the upper rim of the bucket 10.

Bucket 10 is divided into first and second reservoirs 15,16 for water (which will typically contain one or more cleaning agents). First and second reservoirs are in fluid communication through a filter element 20, which will be described in further detail in due course.

The wringer 12 is provided with a deflector 21 which receives water from the wringer bowl 13 through perforations 14. As can be seen from a comparison of Figures 2 and 3, in a first

configuration (Figure 2) wringer 12 is positioned at a first end of bucket 10, above the first reservoir 14; and in a second configuration (Figure 3), wringer 12 is positioned above the second reservoir 15 at the second end of the bucket. However, in each configuration, the deflector acts to direct water from the wringer bowl 13 into the first reservoir only.

Typically, the deflector includes a channel or pipe to direct the flow of water into the desired reservoir 15,16.

As is already known, preferably a sump filter 22 is provided in each reservoir 15,16. Sump filter 22 is typically a perforated plate or a grid or grille and is spaced from the bottom of each reservoir. The sump filter 22 allows larger particulate matter 23 to pass through, but acts to prevent the mop, when placed in the reservoir, from contacting the particulate matter, thereby transferring it to the mop and thence, in use, to the floor.

To assist in an understanding of the present invention, uses of this embodiment will now be described. At the commencement of a cleaning operation, first and second reservoirs 15,16 are filled with water to a level a little below the upper edge of filter element 20. With reference to Figure 2, a mop head 30 is inserted into second reservoir 16. The mop head 30 is then placed in bowl 13 of the wringer and excess water removed. The mop is then used to clean the floor. The mop is then inserted into first reservoir 15, it being appreciated that the whole assembly is designed such that wringer will not obstruct access to the first reservoir, and washed in the water. The water in reservoir 15 will thus become dirtied. The mop is then replaced into the wringer 13 and excess water (dirty) removed. The water will drain along deflector 21 into first reservoir 15. The mop is then inserted into the clean water of second reservoir 16 for rinsing, wrung in wringer 13 and used again to clean an area of floor.

It will be appreciated that the wringing operation will increase the volume of water in first reservoir 15 and thus an imbalance of water depth in the two reservoirs 15,16. Excess water in first reservoir 15 is thus caused to pass through filter element 20 into second reservoir to equalise the water levels. Filter element 20 acts to remove particulate matter suspended in the water such that the water in second reservoir 16 remains considerably cleaner than that in first reservoir 15.

The apparatus may also be used in a slightly modified fashion and is illustrated initially with reference to Figure 3. It will be observed that the wringer assembly is mounted upon the bucket 10 above second reservoir 16. Rather than washing the mop head in first reservoir 15 and rinsing in second reservoir 16, a user may prefer to use just the first reservoir 15 for washing the mop head 30 until such time as the water becomes too dirty. At that stage, the wringer assembly is removed and placed over the first reservoir 15. The user can then continue mopping a floor using water from second reservoir 16. It will be observed that dirty water draining from the wringer 13 continues to be directed into first reservoir 15. Accordingly, the water entering second reservoir 16 continues to be filtered through filter element 20 and remains cleaner as a result.

An alternative embodiment is illustrated in Figure 5. As is commonplace in commercial mop buckets, wringing of a mop head 30 is achieved by squeezing the mop head 30 between two perforated plates or grilles 31,32. In the embodiment shown, the plates 31,32 are pivotally joined at their lower ends. Alternative arrangements are well known, for example, in which the plates remain generally parallel with respect to one another and are brought into closer proximity to provide the squeezing action. As in the first embodiment described above, the vessel 40 is divided into first and second chambers or reservoirs 41,42 by means of a filter element 44 allowing fluid communication therebetween. Sump filter grilles 43 are provided in each reservoir in the conventional manner. A deflector plate 45 directs water wrung from the mop head into second reservoir 42. In use, the mop head is washed in second reservoir 42, wrung between plates 32,32, rinsed in the water of first reservoir 41, wrung again and then used to clean the floor. Thus the water in the second reservoir 42 contains the bulk of the dirt removed from the floor and water in first reservoir 41 remains considerably cleaner, being filtered through filter element 44 as it passes through from second reservoir 42.

Figures 6 to 8 illustrate one example of a filter element 20,44. Filter element 20,44 includes a filter case 50 having an inlet 51 with a grille 52 to prevent ingress of large particulate matter and an outlet 53, also having a grille. The filter element further includes a filter carrier 54 comprising a plate 55 dividing filter case 50 and defining a fluid flow path between the inlet and the outlet of the filter element. Upon each face of the filter carrier 54 are mounted open-

cell foamed plastics filters 60,61, supported in place by means of retaining pegs 62, one at each corner and each face of the filter plate 55, engaging corresponding apertures 63 within each foam filter 60,61. As shown, preferably, each foam filter 60.61 is formed from two or more foam filter elements each having different porosities, thereby acting as a multiple-stage filtration system. The foam filters 60,61 are easily removable from the apparatus at the end of a cleaning operation, and cleaned by rinsing under running water or in a washing machine.

An alternative filter element design is illustrated in Figures 9 and 10. As described above, the filter element includes a filter case 70 having inlet and outlet grilles as described above and, in this embodiment, having a closable lid 71, coupled to case 70 by a hinge 72. Typically, filter case 70, lid 71 and hinge 72 are formed as a unitary component by injection moulding of a plastics material. A central open-cell foamed filter 73 is sandwiched between a pair of lower porosity paper or felt filters 74.

Figure 11 illustrates a yet further alternative filter element. The filter element comprises a filter case 80, typically of an injection moulded plastics material, comprising two mating halves 81,82. Each half 81,82 includes a generally circular recessed portion for receipt of a filter disc 83. Each filter case half includes a plurality of apertures 84 to provide an inlet and outlet to the filter element. Filter disk 83 comprises an open-cell foamed plastics material 85 supported by a circular ring 86 and is rotatable in filter case 80 such that as, in use, the filter portions exposed to the flow of water flowing from the inlet to the outlet become dirty, the filter disc can be rotated to present a clean area of filter.

Alternative filter arrangements and constructions will be readily apparent to those skilled in the art. For example, the porosity of the filter components of the filter element may be selected to allow a preferential flow of water in one direction.

The apparatus of the present invention may include more than two reservoirs. For example, the apparatus may include three reservoirs, which may be arranged (Figure 12) with a central reservoir 90 in fluid communication through respective filter elements 91 with a reservoir 92,93 on each side thereof, or which may be arranged (Figures 13,14) radially about a common central point. In this arrangement two of the reservoirs 95,96 are in fluid

communication with the mutually adjacent reservoir 97 through respective filter elements 98. Reservoirs 95,96 may also be in mutual fluid communication through a further filter element 98 (Figure 14) or fluid communication between said reservoirs may be prevented (Figure 13). The wringer assembly and deflector will be modified as necessary to suit the arrangement of reservoirs provided.

It will be appreciated that the apparatus of the present invention allows water to be kept cleaner for longer whilst washing floors. This reduces the amount of time needed to repeatedly renew the water during use, reduces the water requirement and also that for additive detergents etc.

Claims.

1. A vessel for use with a mop or similar floor-cleaning apparatus, wherein the vessel comprises first and second fluid reservoirs in fluid communication through a filter element, and the vessel further comprising draining means adapted for use in draining excess fluid from a mop.

2. A vessel as claimed in claim 1 wherein the filter element is removable.

3. A vessel as claimed in Claim 1 or Claim 2 wherein the filter element comprises a filter element case having an inlet and an outlet defining a fluid flow path and a filter is provided in the fluid flow path.

4. A vessel as claimed in Claim 3 wherein the filter comprises an open-cell foamed material.

5. A vessel as claimed in Claim 3 or Claim 4 wherein the filter has a plurality of regions of different porosity

6. A vessel as claimed in Claim 3 or Claim 4 wherein the filter comprising a plurality of filter components, adjacent in the fluid flow path, each having different porosity from the adjacent component.

7. A vessel as claimed in any one of claims 1 to 6 wherein each reservoir includes a sump filter.

8. A vessel as claimed in Claim 8 wherein each sump filter comprises a perforated sheet or grille.

9. A vessel as claimed in any one of claims 1 to 8 wherein the draining means comprises a generally conically shaped bowl having a plurality of perforations therein.

10. A vessel as claimed in any one of claims 1 to 8 wherein the draining means comprises two opposed perforated plates or grilles moveable with respect to each other between a first position in which the plates or grilles have a first separation and a second position in which the plates have a second separation, at least a portion of said second separation being greater than said first separation.

11. A vessel as claimed in Claim 10 wherein the first and second plates or grilles are pivotally mounted with respect to each other.

12. A vessel as claimed in any preceding claim wherein the draining means includes a deflector element adapted to direct a flow of fluid into said first reservoir.

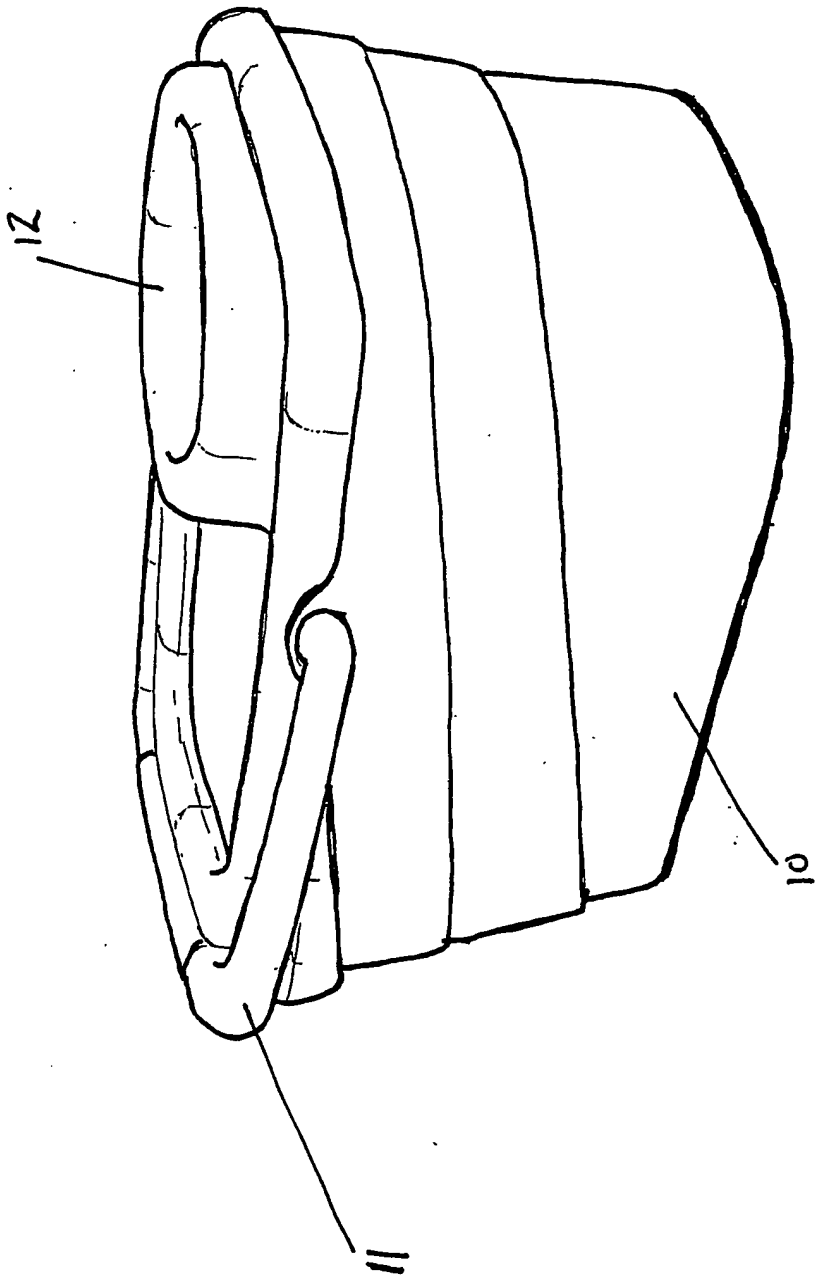
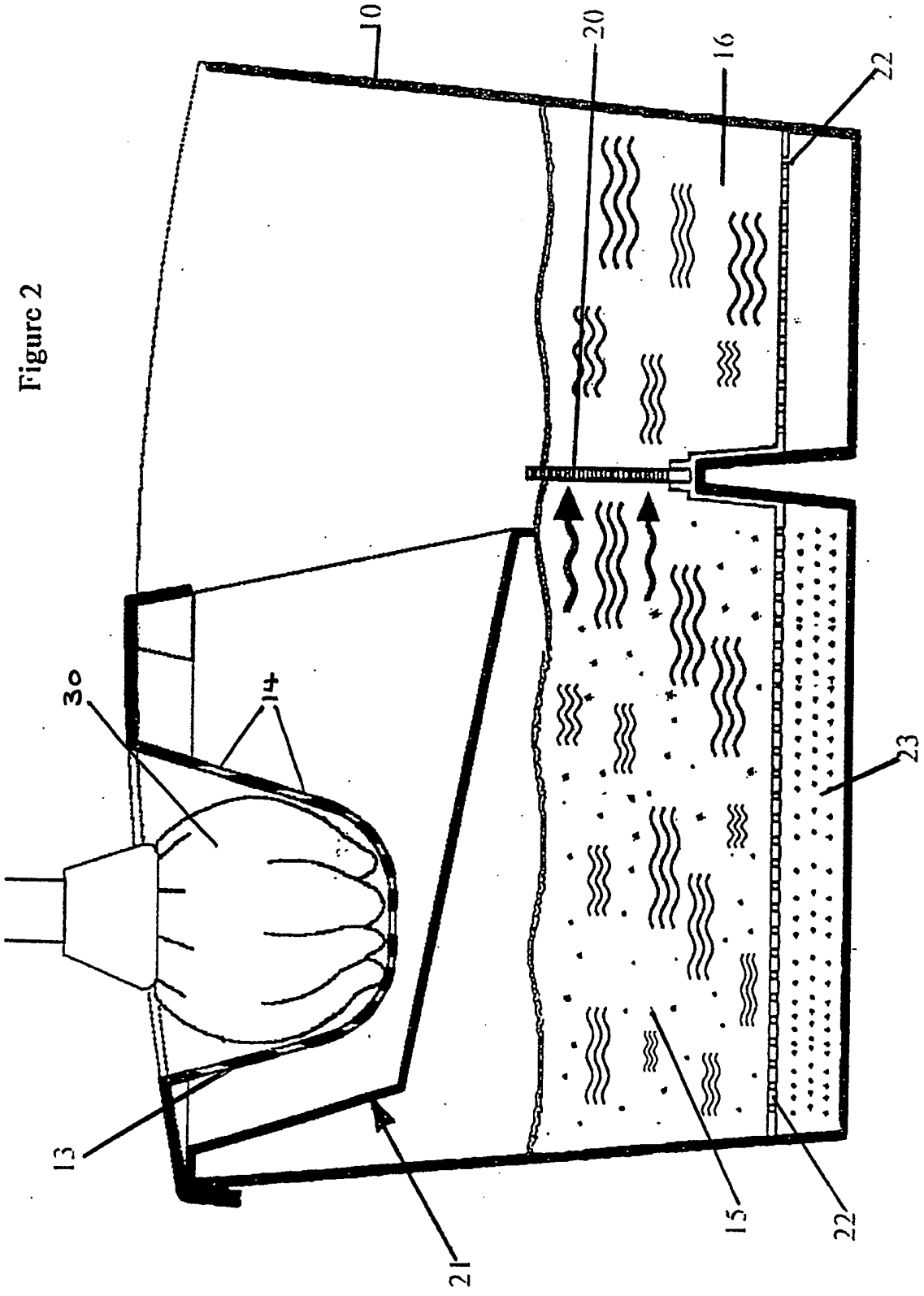


FIGURE 1

Figure 2



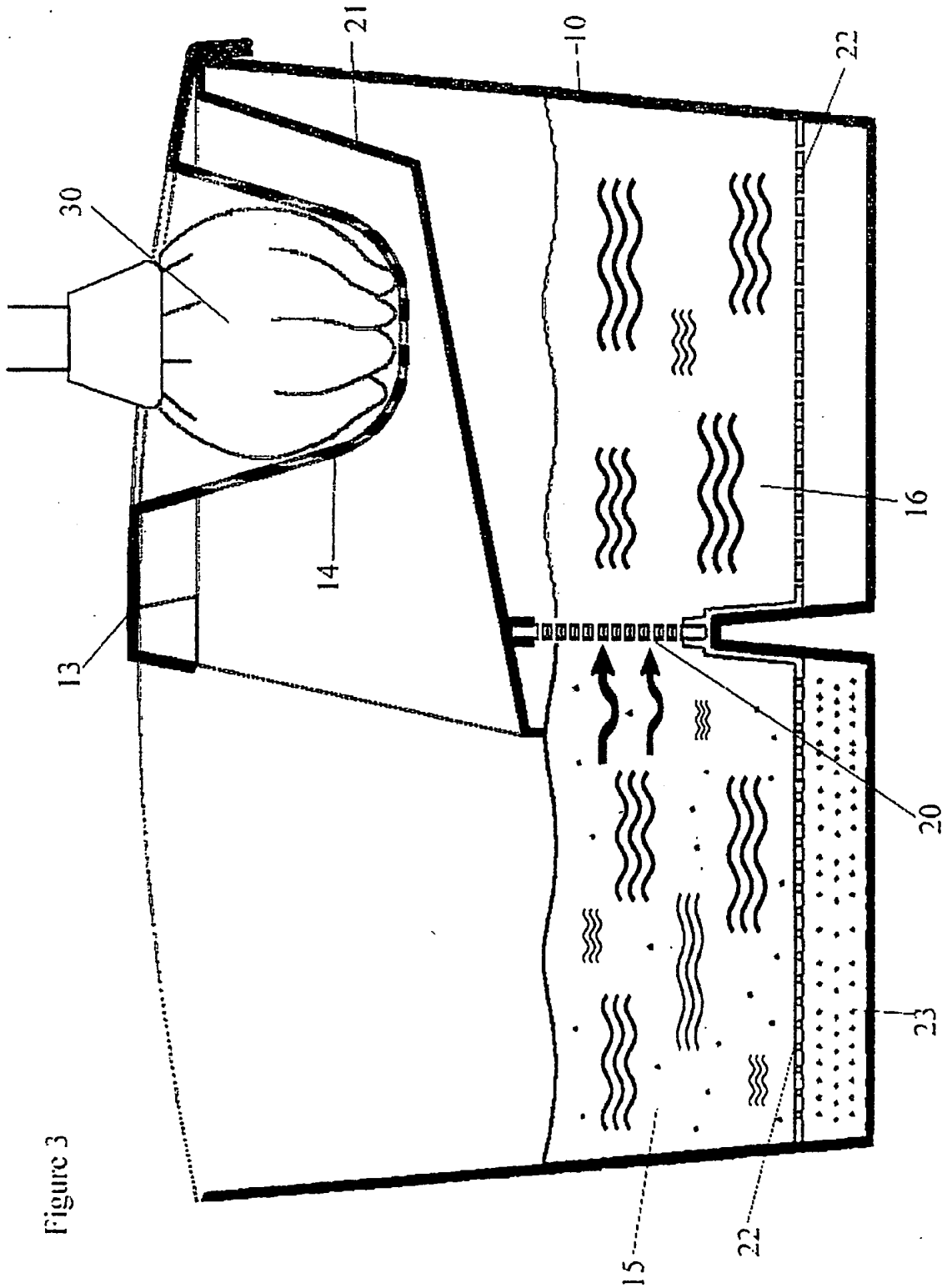


Figure 3

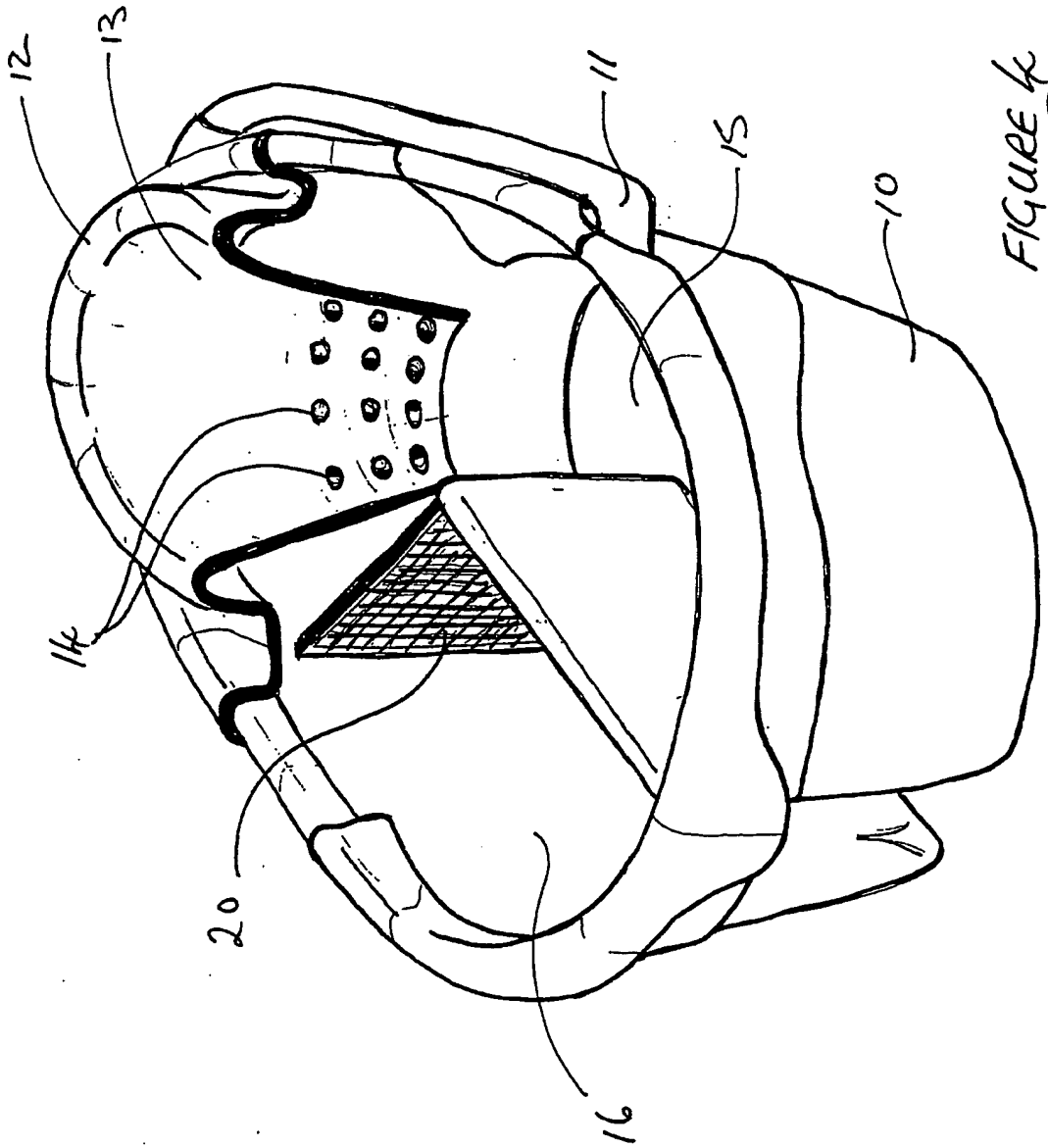


FIGURE 4

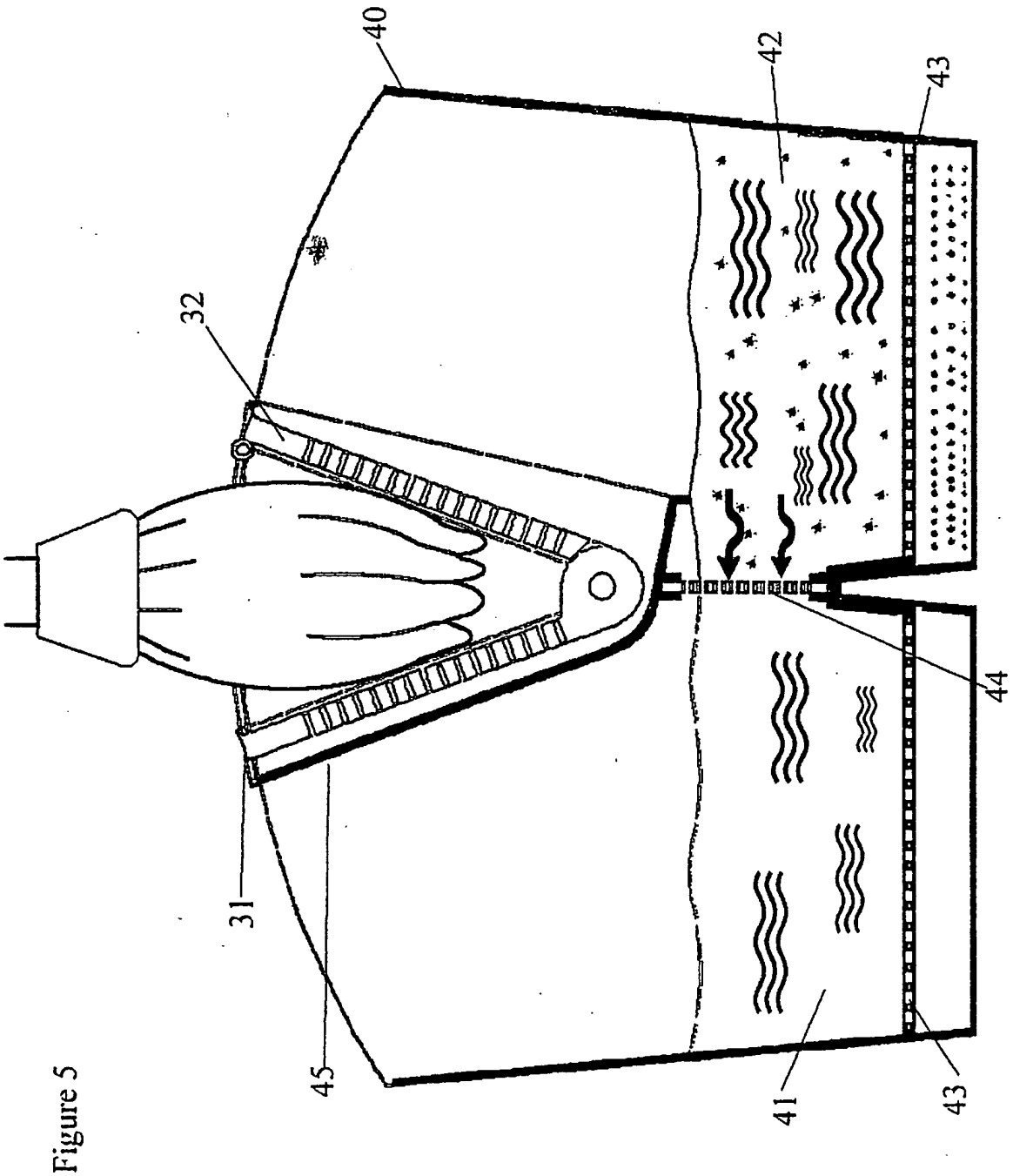


Figure 5

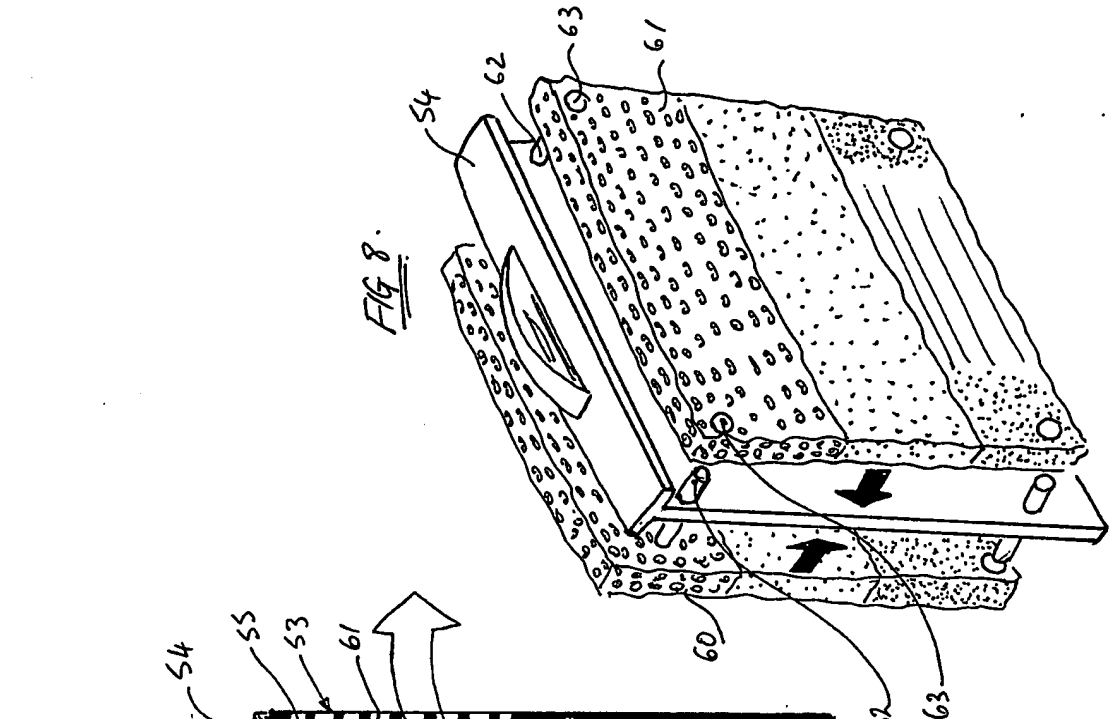


FIG 8.

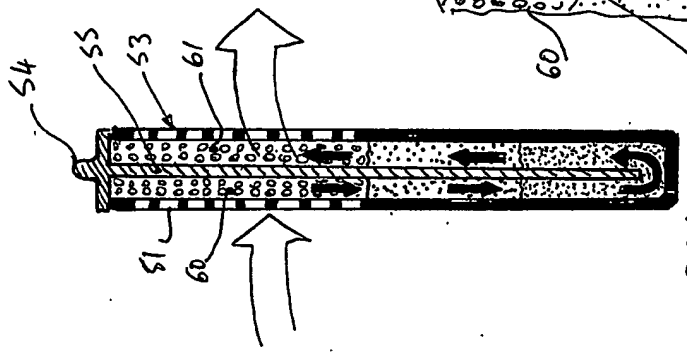


FIG 7.

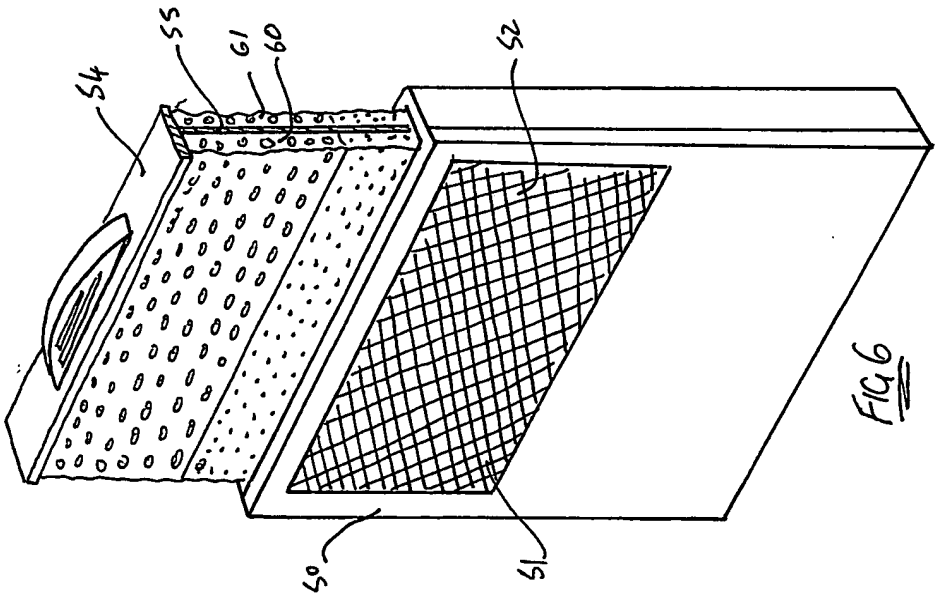


FIG 6

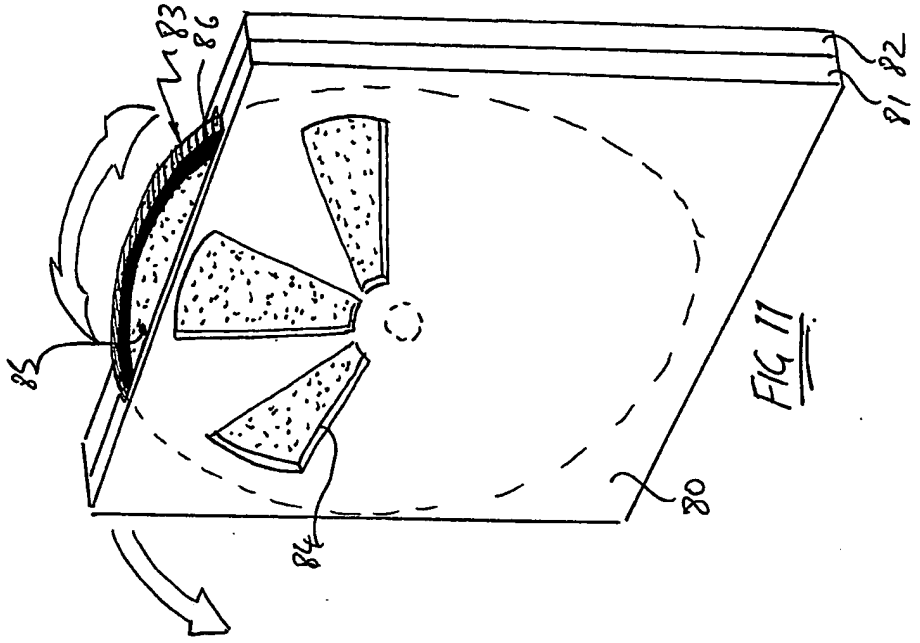


FIG 11

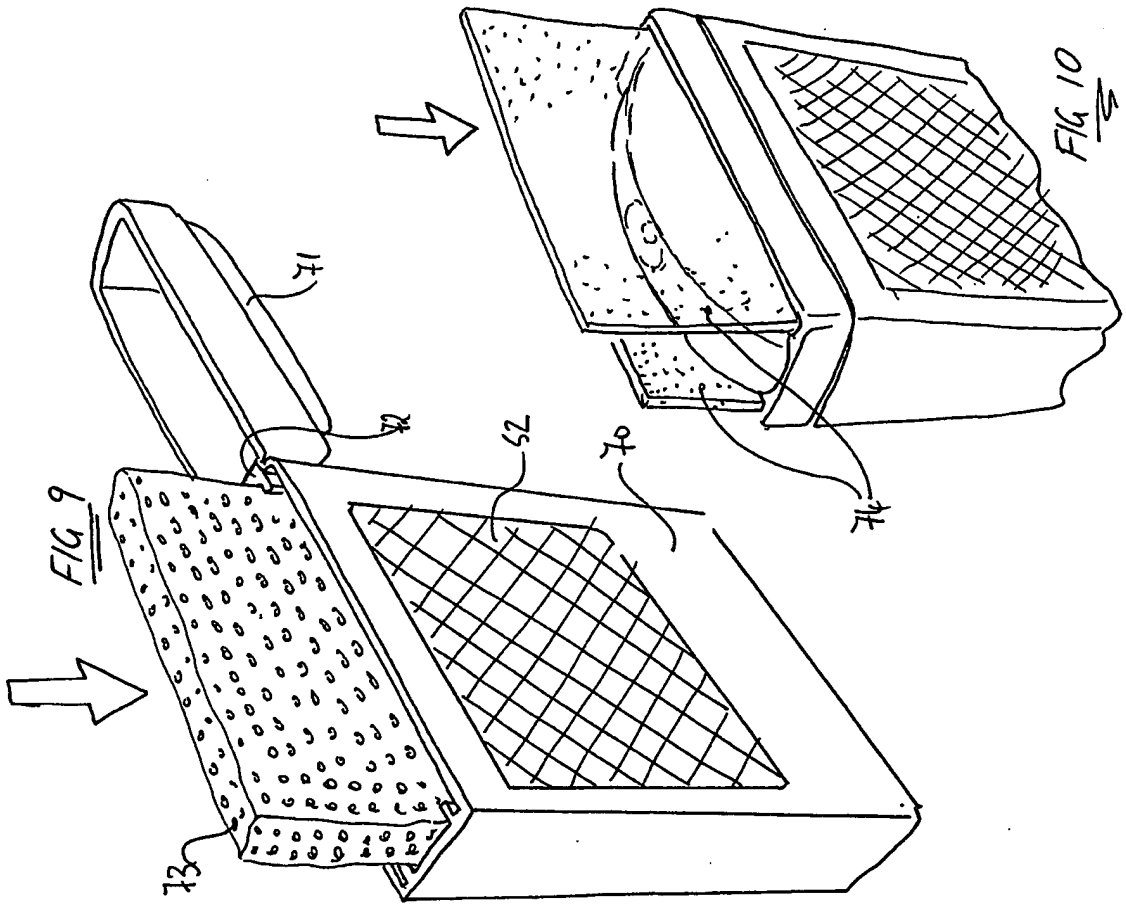


FIG 9

FIG 10

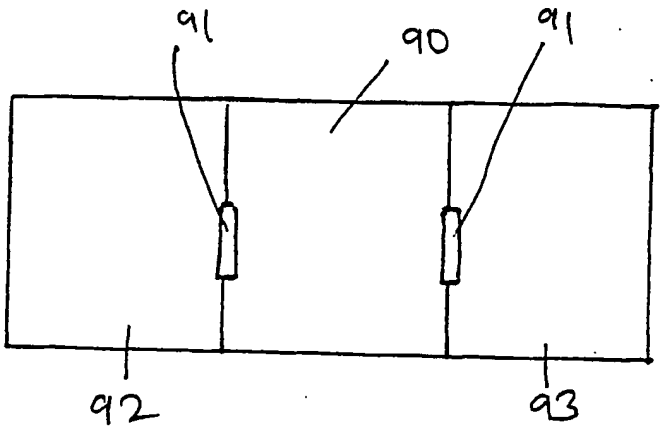


FIGURE 12

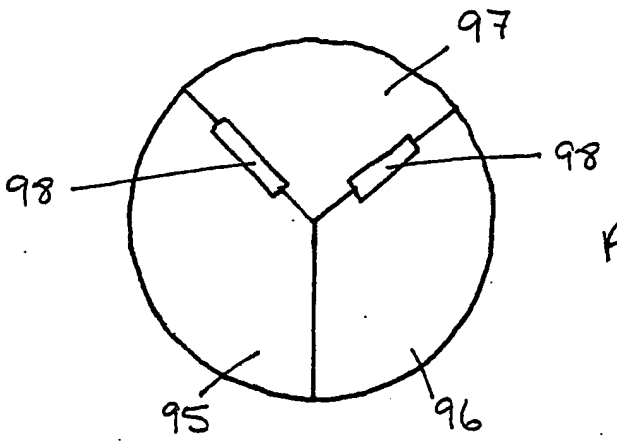


FIGURE 13

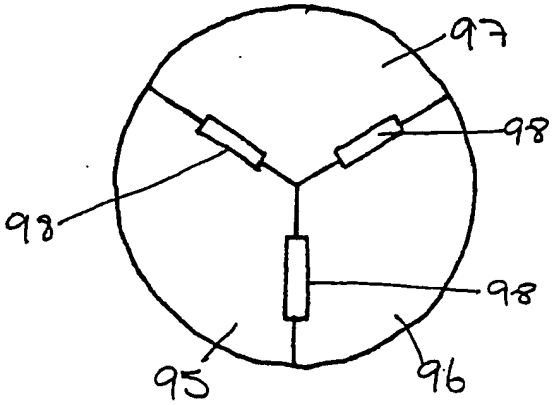


FIGURE 14

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 03/00541

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A47L13/58

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A47L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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X	US 6 279 195 B1 (B. S. BIGGS) 28 August 2001 (2001-08-28) column 3, line 59 - line 64 column 4, line 30 - line 46 column 5, line 4 -column 6, line 8 claim; figures 1,2,5	1,2,10, 11
Y		3-8,12
A		5,6

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
24 June 2003	01/07/2003

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INTERNATIONAL SEARCH REPORT

Inter nal Application No
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INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter nal Application No
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